DOCUMENT RESUME

ED 265 337 CE 043 274

TITLE The Manufacturing Process. Youth Training Scheme. Core Exemplar Work Based Project.
INSTITUTION Further Education Staff Coll., Blagdon (England).
REPORT NO ISBN-0-948361-42-5
PUB DATE 84
NOTE 26p.; Portions printed on colored paper. For other guides in this series, see CE 043 245-288.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052) -- Guides - Classroom Use - Materials (For Learner) (051)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Behavioral Objectives; *Career Education; Competency Based Education; Core Curriculum; Foreign Countries; Job Skills; Learning Activities; Learning Modules; *Manufacturing; *Manufacturing Industry; On the Job Training; Postsecondary Education; Records (Forms); *Trade and Industrial Education; *Work Experience Programs
IDENTIFIERS England; *Moldmaking

ABSTRACT

This trainer's guide is intended to assist supervisors of work-based career training projects in teaching students to follow the manufacturing process of a component from the first operation to final inspection. The guide is one in a series of core curriculum modules that is intended for use in combination on- and off-the-job programs to familiarize youth with the skills, knowledge, and attitudes necessary for success in the workplace. Included in the guide are the following components: project information, a summary of the content and approach of the guide, supervisor's notes, background information, lists of tasks and core skills, an action plan that includes suggested learning activities, supervisor and trainee review sheets, and an assessment form. (YLB)

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Youth Training Scheme

CORE EXEMPLAR WORK BASED PROJECT

The manufacturing process

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CE043274

ESF
CORE SKILLS PROJECT
YTS

OTF No: 6

PROJECT No: M|43

TYPE Individual

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Coombe Lodge, Blagdon, Bristol, BS18 6RG ✆ 0761 62503

ISBN 0-948361-42-5

ASSESSMENT OF CORE SKILLS

This series of projects contains a number of different formats for recording assessment of core skills. These formats are offered for experimental purposes; none is proven as the 'best' method. All are based on the principle that feedback to trainees is a necessary part of the learning process and that such feedback should include information on core skill development.

Further work is being carried out on the methods of assessing achievement of core skills in work-based learning and of how to log such achievement on a record which trainees can take away from YTS. Some of the results of this work will be included in later MSC/ESF Core Skills Project publications.

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INTRODUCTION

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WHAT ARE WORK-BASED PROJECTS?

Work-based projects are learning materials which aim to make the most of all the possibilities for developing trainees' skills, knowledge and attitudes in the workplace. They build upon everyday workplace tasks to provide experience of the whole range of YTS learning opportunities.

The projects in this series have been tested with managing agents as part of the YTS Core Project, which is jointly financed by MSC and the European Social Fund. In some cases managing agents will be able to use the projects as they are. In others they will need to be adapted to the circumstances of a particular workplace or to the aims of a particular scheme. Some managing agents will prefer to produce their own projects. For such cases these examples aim to demonstrate some principles of good design in work-based learning materials. These principles are:

To encourage trainees to learn by doing
To make the most of all the experiences which are available to trainees in the workplaces.
To start from a real task which is seen as relevant by all parties involved — trainees, workplace supervisors, trainers and off-the-job tutors.
To help trainees see the relationships between things learnt on- and off-the-job.
To base the assessment of achievement upon trainees' actual performance in tasks.
To look for all the opportunities for learning which arise from a task and, in particular, to help trainees to develop the core skills. These skills, in number, communication, problem-solving and practical activities, are used in a wide variety of tasks and are essential if trainees are to achieve competence in those tasks*. They are the skills — of finding out information, planning how to do things, overcoming difficulties and so on — which help trainees to learn more quickly in new situations, either in the same workplace, in a different one, or in the world outside work.

Such skills are required naturally by the workplace tasks in these projects and, in requiring trainees to go beyond the task itself, the projects deliberately *add* to the range of core skills which are required in an everyday working situation. This is especially important for some of the skills of communication and problem-solving which trainees are often not given the opportunity to exercise in work experience.

These principles can be incorporated in projects for all placements and for trainees of all ability levels. Although the projects in this series follow a common format, there is no single 'best' style. Nor is any special expertise in writing necessary. Good work-based projects can be produced by anyone who is determined to help trainees to exploit all of the potential for learning in work experience.

*A technical manual 'Core Skills in YTS' is currently available from MSC. It is supported by a short introductory leaflet and a practitioner's guide for supervisors. A separate manual is available on computer literacy/information technology.

PROJECT INFORMATION

By following the manufacture of a component through from drawing to final inspection, the trainee becomes aware of the processes involved in production. He/she will find out more about the workplace, personnel and the work they do - the project, then, gives the trainee a clearer understanding of the overall concept of production work.

It was written for trainees on a YTS scheme at AUSTIN ROVER (DREWS LANE PLANT) and completed with good results.

The project could be modified to enable any trainee involved in production processes to find out more about the way work is organised, the stages involved and the tools and equipment used.

It is particularly useful early in any new placement so that the trainee learns to find his/her way about the organisation.

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SUMMARY

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The trainee is asked to complete a survey on a component while working in a production area. The trainee will follow the manufacturing procedure from the first operation to final inspection.

SUPERVISOR'S NOTES

INTRODUCTION

This work based project is designed to focus the trainee upon the CORE SKILL areas of: number; communication; practical skills, and problem-solving. Wherever possible, it is also designed to provide learning opportunities to improve personal effectiveness; to provide wider knowledge of the world of work and elsewhere; and to furnish the trainee with skills which can be transferred to other situations.

The essence of the work based project is that people learn more quickly and effectively by actually doing something.

The following notes are designed to help you, your staff, and the trainee, so that the project can be carried out with a minimum of disruption to normal work activity.

1. Where relevant, please advise other staff that the trainee will be doing the project;

2. Please ensure that the trainee has read the project details and understands what is required;

3. Please ensure that the trainee is aware of any aspects of safety, hygiene or security which might touch upon the project;

4. Please ensure that the trainee appreciates that good planning will make the task easier. Wherever possible, and before the project starts, the trainee should be encouraged to take responsibility for his/her learning by estimating time, deciding on equipment and materials, identifying possible hazards and other problems, and generally "thinking the project through".

5. Upon completion of the project discuss with the trainee the activities he/she has been engaged in. What problems were there? What has he/she learnt? Would he/she tackle the project differently?

Encourage the trainee to complete the trainee's review page.

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For this particular project you may find the following notes of help:

Encourage the trainee to do as much of the planning and communication needed for the successful completion of this project him/herself.

TASK 1

Thought needs to be given to the selection of the component for the trainee to follow through. Try to choose a component that has sufficient stages in it to give scope and meaning to the project, but not so complex that the trainee will become confused in trying to trace the job through the manufacturing process.

TASK 3

You may decide to forewarn the supervisors of the other sections. If this is done, be sure to explain that part of the exercise is to develop communication skills and arranging to work on their section is an important task for the trainee to complete.

Names

TRAINEE .....

SUPERVISOR .....

TUTOR .....

Times

Please fill in the table below. This will show the time you spend on completing this project. The first column has been filled in as an example. Make another table if you need more space.

DATE	16/6			
START	1.30			
FINISH	3.00			
TIME SPENT (HOURS)	1½			

BACKGROUND

In most engineering workshops a range of operations or jobs will be carried out to produce the finished component. Most workers only carry out part of this process, and this project enables the trainee to see a component through each stage in the manufacturing process.

SITUATION

AUSTIN-ROVER (DREW'S LANE, BIRMINGHAM). Could be modified to suit any situation where production or flow lines exist.

PURPOSES

This project will enable you to find out more about the production process in which you are involved. It gives you the opportunity to spend time on each section involved in manufacturing a component to observe and sometimes take part in the machining operations.

Doing this project will enable you to learn more about the engineering industry. It will also help you to develop your CORE SKILLS (number, communication, problem-solving, and practical skills). Increasing your abilities in these skills will make it easier for you to change jobs and retrain when the need arises.

The tasks you are asked to do are outlined below, together with the most important CORE SKILLS that they contain. When you have finished each task, ask your supervisor to tell you how well she/he thought you did in the task, and record this on the Assessment Form near the back of this Project. This record will be needed to complete your Certificate at the end of your YTS year.

WBP TASK	ACTIVITY	CORE SKILL
1.	Find out information from the drawing. Make a stage drawing and work out necessary calculations.	Find out information from written sources. 6.2 Provide information in writing, and by means of tables and diagrams. 7.3 Work out numerical information. 1.2
2.	Plan out a timetable showing the way you will carry out the project and discuss this with your supervisor.	Plan the order of activities 9.1 Discuss with other people in the workplace how things are to be done. 8.6
3.	Explain to supervisors of each section why you want to spend time there.	Provide information by speaking to other people in the workplace. 7.1 Plan how to present information. 9.6
4.	Design a fault analysis chart.	Provide information in writing, and by means of tables and diagrams. 7.3

5.	Find out about the paperwork involved in production processes and draw a diagram showing the flow of paper that accompanies each component.	Find out information by speaking to other people. 6.1 Provide information in writing, and by means of tables and diagrams. 7.3
6.	Observe experienced workers and find out how they manufacture each stage.	Find out information by observing. 6.3
7.	Discuss with other workers the way they carry out machining.	Discuss with other people in the workplace how things are to be done. 8.6
8.	Record information about scrap or reject work and Check your recording with the supervisor Observe flow of work and Discuss the way work is allocated.	Provide information in writing, and by means of tables and diagrams. 7.3 Check the accuracy of written information. 11.5 Find out information by observing. 6.3 Discuss with other people in the workplace how things are to be done. 8.6
9.	Observe inspection procedure and discuss the way the section is organised with the Inspector. Note number of components rejected or scrapped and find out information about why components are scrapped.	Find out information by observing. 6.3 Discuss with other people in the workplace how things are to be done. 8.6 Count items singly or in batches. 1.1 Find out the facts about things that have gone wrong. 6.7
10.	Draw a plan of production, show total production process.	Provide information in writing, and by means of tables and diagrams. 7.3

11.	Plan how you are going to present your final report.	Plan how to present information.	9.6
	Write your report to your supervisor.	Provide information in writing, and by means of tables and diagrams.	7.3
12.	Present the results of survey to the rest of your group.	Plan how to present information.	9.6
		Provide information by speaking to other people in the workplace.	7.1

Each CORE SKILL is identified by number in the PRACTITIONER'S GUIDE to the YTS CORE, which contains advice and guidance on what CORE SKILLS are and their uses. The numbers are included here for ease of reference.

ACTION PLAN

This project gives you the opportunity to follow a component through the manufacturing process, from drawing to inspection. Read it through carefully and discuss it with your supervisor.

TASK 1

Find out from your supervisor which component has been selected for you to follow through the manufacturing process. Obtain from your supervisor a drawing of the component. Study it carefully and using it as a guide, make a stage drawing of the component, as it is at each machining operation. Show clearly details of the machined parts, any tolerances you have to work to, surface finish required and anything else you think should be noted on a stage drawing.

Show this and your calculations to your supervisor to make sure they are correct.

TASK 2

In order to achieve the most from this project, it is important to plan carefully the order in which you will do each activity.

Make yourself a timetable which shows each stage, the section you will be in, the date you will go there and the time you will spend there.

Discuss you plan with your supervisor. Does he think that you have allowed sufficient time? Are you following the correct procedure? Consider his comments and revise your plan if necessary.

TASK 3

For each machining operation and final inspection, arrange with the supervisor to stay on the particular area for at least one day. This will enable you to gather enough information for your final report. Explain to the supervisor exactly what you want to do whilst on his section. You must gain his/her permission, so think carefully about what you should say and how you should approach the supervisor.

TASK 4

So that you can record accurately any problems that occur at each stage of manufacture, design a Fault Analysis Chart which will enable you to record the following factors neatly:-

1. Reject work and
   (a) why it was rejected;
   (b) whether it is possible to reclaim the work;
   (c) what action is necessary to reclaim it

2. Scrap work and (a) the reasons why it is scrap;
(b) what happens to the scrap.

3. Any action to avoid any further scrap/rejected work.

What other information will you need to record?

Show your completed Fault Analysis Chart to your supervisor to check that the layout and the information you are seeking to record are correct.

You are now ready to start tracing through the total manufacturing process.

TASK 5

Paperwork is an increasingly important feature in any production process.

Obtain duplicate copies of the forms that accompany the component and keep them with your project notes.

Find out from your supervisor exactly what the information on the form means, what must be recorded and why.

Also find out where the forms come from and their main purpose. What happens to the information at the end of the process?

Draw a diagram showing the flow of paper that accompanies the components.

Show this to your supervisor to make sure it is correct.

TASK 6

Go to the first stage in the machining process as agreed in your plan. Watch carefully the way in which an experienced worker goes about machining this stage in the component's manufacture. Make a note of the machine he/she is using, and other tools or equipment used and adjustments made to the machine during the operation. (Pay careful attention to the way in which checks are taken to ensure that the component is made according to the drawing. What safety checks are also taken?) At the appropriate time ask him/her questions about the way in which he/she tackled the component.

Discuss with the supervisor of the section whether it would be possible for you to machine this stage of the component. If approval is given, carry out this stage in the machining operation. Work according to the drawing and follow all health and safety procedures.

TASK 7

Repeat task 6 for each stage in the production process.

TASK 8

During your observation of the machining process and at any time that you are operating machinery, use your Fault Analysis Chart to record information about scrap or rejected work. After each entry, check with the supervisor that your information is correct, and that you haven't left anything out.

Observe the flow of work through the section. Are there any bottle necks?

What reasons could there be for bottle necks or interruptions to a smooth flow of work? Note these in your project.

Discuss the way work is allocated with the supervisor and other workers. Keep careful notes.

TASK 9

The inspection of quality is an important stage in any manufacturing process. When you visit the final inspection department, carefully observe the inspection procedure and make notes.

Discuss with the inspector the procedure used to inspect components.

Notice how many components reaching final inspection were :

1. correct
2. rejected
3. scrap

and the reasons for 2 and 3. Record the figures and the information you find out on your Fault Analysis Chart. Look at your chart and the reasons you have recorded for 2 and 3 happening at this stage. Is there any information that you have recorded on your chart or observed generally as you followed the manufacturing process through, that might cut down on the number of components in the rejected or scrap categories?

Discuss any ideas or information you have with the inspector and your supervisor.

TASK 10

Draw a plan showing the total machining process. For each section note the machines used and the stage in the production process. Indicate on the plan any major bottle necks in production that you observed. If possible, take photographs to illustrate your plan. Before you do this you must secure the permission of your supervisor and the supervisors of the areas you wish to photograph.

TASK 11

You should now have a clear idea of the production process and may have suggestions which will reduce bottle necks and reject work.

Plan carefully how you are going to present your findings to your supervisor. Use charts, diagrams, and graphs, to illustrate your report.

Give your report to your supervisor and discuss it with him.

TASK 12

Arrange with your instructor or tutor to present your project to the rest of your group. Again, this will need careful planning, so think carefully about what you will say.

When making the presentation, be prepared to answer questions about the way you organised the project and the information you found out.

TRAINEE REVIEW

PLEASE COMPLETE THIS FORM IN AS MUCH DETAIL AS POSSIBLE AND DISCUSS IT WITH YOUR SUPERVISOR AND TUTOR.

1. Were you offered a selection of Projects to choose from? If so, why did you choose this one?

2. What did you think of it? Was it - easy, hard, interesting or boring?

3. What did you learn? (Look at the list of Purposes).

4. Did you learn something which was not on the list of Purposes?

5. Did you need help with any particular part of the Project? What kind of help did you get?

6. Were there any words in the Project that you did not understand? Please list them.

7. Do you think you could use what you learned in another job, or outside work?

8. Has this Project helped you decide whether you need further training in certain areas?

SUPERVISOR REVIEW

Please refer to Supervisor's Notes.

Please read the questions included under Trainee Review.

Please complete the Assessment Form and discuss your assessment with the trainee before initialling it to show that you both agree with the assessment.

COMMENTS:

ASSESSMENT
explanatory notes

In completing this wbp the trainee has the opportunity to demonstrate competence in the CORE SKILLS listed on the attached form.

The first two columns list the wbp Tasks and the CORE SKILLS which occur within them.

You are asked to assess the trainee's competence in these CORE SKILLS according to the amount of support from you that the trainee needed, for example:-

1) if a trainee is asked to "find information from written sources" and you provide the trainee with all the sources of that information, together with telling the trainee where to look in any particular source, then that trainee is obviously being given much more support in finding that information than a trainee who identifies the sources and extracts correct information unaided;

2) if a trainee is asked to undertake a task which involves "noticing the needs of customers or clients", and needs considerable prompting to approach a customer, then that trainee is obviously being given more support than a trainee who takes the initiative in approaching the customer.

To be regarded as fully competent in the CORE SKILLS, the trainee should need to be offered no more support than you would normally give to any experienced worker.

Most of the time job competence and CORE SKILLS competence are likely to be the same, but sometimes this may not be so. For instance, a trainee involved in machining a particular component may be competent so far as planning the work is concerned (a CORE SKILL), but may not have reached experienced worker speeds (an occupational skill).

Please tick the appropriate box and initial in the space provided, after you have discussed your assessment with the trainee and agreed any further training required.

ASSESSMENT FORM

PROJECT TITLE THE MANUFACTURING PROCESS WBP NO M/06/009 DATE

TRAINEE'S NAME SUPERVISOR'S NAME

WBP TASK NO	CORE SKILLS ASSESSED	NEEDED A LOT OF ASSISTANCE	NEEDED SOME ASSISTANCE	LITTLE OR NO ASSISTANCE		COMMENTS INCLUDING NO OPPORTUNITY	AGREED INITIALS	
				NEEDS MORE PRACTICE	COMPETENT		TRAINEE	SUPERVISOR
1	6.2 Find out information from written sources.							
1,4,5,8 10,11	7.3 Provide information in writing, and by means of tables and diagrams							
1	1.2 Work out numerical information.							
2	9.1 Plan the order of activities.							
2,7,8,9	8.6 Discuss with other people in the workplace how things are to be done.							
3,12	7.1 Provide information by speaking to other people in the workplace.							
3,11,12	9.6 Plan how to present information.							
5	6.1 Find out information by speaking to other people.							

ASSESSMENT FORM continued.

WBP TASK NO	CORE SKILLS ASSESSED	NEEDED A LOT OF ASSISTANCE	NEEDED SOME ASSISTANCE	LITTLE OR NO ASSISTANCE		COMMENTS INCLUDING NO OPPORTUNITY	AGREED INITIALS	
				NEEDS MORE PRACTICE	COMPETENT		TRAINEE	SUPERVISOR
6,8,9	6.3 Find out information by observing.							
8	11.5 Check the accuracy of written information.							
9	1.1 Count items singly or in batches.							
9	6.7 Find out the facts about things that have gone wrong.							

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